

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 2167

Roll No.

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B.Tech.

(SEM. V) ODD SEMESTER THEORY

EXAMINATION 2013-14

COMPUTER GRAPHICS

Time : 2 Hours

Total Marks : 50

Note :—Attempt **all** questions.

1. Attempt any **two** parts of the following : (2×7=14)
 - (a) Explain Frame buffer and Video basics. Also explain the terms Pixel, Aspect Ratio, Resolution.
 - (b) Develop and write mid point circle algorithm. Apply it to predict the pixels in any octant for the circle whose centre is origin and radius = 14 units.
 - (c) Explain the parallel version of line algorithm by two methods.
2. Attempt any **two** parts of the following : (2×6=12)
 - (a) Reflect the polygon whose vertices are $(-1, 0)$, $(0, -2)$, $(1, 0)$ and $(0, 2)$ about the :
 - (i) Horizontal line $Y = 2$
 - (ii) Vertical line $X = 2$.

(b) Write Cohen and Sutherland line clipping algorithm. Apply it for calculating the saved Portion of a line from (2, 7) to (8, 12) in a window ($X_{w \min} = Y_{w \min} = 5$ and $X_{w \max} = Y_{w \max} = 10$).

(c) Write Sutherland-Hodgeman polygon clipping algorithm. Explain the modification given by Weiler and Atherton for concave polygon.

3. Attempt any **two** parts of the following : **(2×6=12)**

(a) Derive rotation about X-axis, Y-axis and Z-axis matrices in 3-D. Prove that for any rotation matrix

$$R^{-1}(\theta) = R(-\theta).$$

(b) Derive oblique parallel projection and perspective projection matrices.

(c) Establish and write Cyrus-Beck 3-D line clipping algorithm.

4. Attempt any **two** parts of the following : **(2×6=12)**

(a) Write at least 4 properties of Beizer curves. Calculate and roughly trace the Beizer curve for three control points (1, 1), (2, 2) and (3, 1).

(b) Explain specular reflection and phong model.

(c) Write Depth-buffer method algorithm of hidden lines.